What We Do

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Resource Mix

New England's wholesale electricity markets have so far attracted investment in over 15,000 megawatts (MW) of new, mostly efficient, low-carbon-emitting power generation facilities and demand-side assets. Over 13,000 MW more are proposed, as of January 2016:

- 63% of this is natural gas-fired generation
- 33% of this is wind projects
- The remainder includes projects with other types of fuels

Investment in new generation ensures that the grid operates reliably and that adequate supply is available to meet demand. Because private firms make this investment and not public utilities, consumers are shielded from the investment risks they had been exposed to before the introduction of competitive markets.

However, the region's increased dependence on natural gas-fired resources and the remoteness and variable nature of wind resources has introduced new concerns. Learn more in Today's Grid Challenges.

Sources of Electricity Used in 2015

Here's the breakdown of the amount of electricity produced by generators in New England and imported from other regions to satisfy all residential, commercial,

Fast Stats

- 350 generators
- 31,000 MW of generating capacity
- 13,000 MW of proposed generating capacity, mostly natural gas (source: January 2016 ISO Interconnection Queue)
- 4,200 MW of nongas generating capacity retired or retiring 2013–2019, with over 25% of capacity (almost 8,300 MW) retiring or at-risk of retirement by 2020
- 600 MW of active demand response (DR) and 1,700 MW of energy efficiency through the capacity market

and industrial customer demand during 2015 . This is called Net Energy for Load (NEL). You can also download the most current information from the Net Energy and Peak Load by Source spreadsheet in ISO Express. That report provides the data by month and year since 2000.

Note: Numbers are preliminary pending 90-day resettlement.

	GWH (a)	% OF GENERATION	% OF NEL
Total Generation (b)	107,887	100.0%	85.1%
Gas	52,366	48.5%	41.3%
Nuclear	31,890	29.6%	25.1%
Renewables	9,746	9.0%	7.7%
Wood	3,462	3.2%	2.7%
Refuse	3,312	3.1%	2.6%
Wind	2,169	2.0%	1.7%
Solar	463	0.4%	0.4%
Landfill Gas	297	0.3%	0.2%
Methane	43	0.0%	0.0%
Steam	0	0.0%	0.0%
Hydro	8,068	7.5%	6.4%
Run-of-River and Pondage	6,615	6.1%	5.2%
Pumped Storage	1,453	1.3%	1.1%
Coal	3,884	3.6%	3.1%
Oil	1,963	1.8%	1.5%
True-Up (c)	-30	-0.03%	-0.02%
Net Flow Over External Ties (d)	-20,905		16.5%
New Brunswick	-4,108		
Québec	-12,909		
New York	-3,888		
Imports over the External Ties	-24,225		
New Brunswick	-4,136		
Québec	-12,911		
New York	-7,179		
Exports over the External			

(a) GWh stands for gigawatt-hour.

(b) As of January 2016, this chart approximates the amount of generation by individual fuels used by dual-fuel units, such as natural-gas-fired generators that can switch to run on oil and vice versa. Previously, the report attributed generation from such units only to the primary fuel type registered for the unit. The new reporting flows from changes related to the Energy Market Offer Flexibility Project implemented December 2014. See the notes in the Net Energy and Peak Load by Source Report for more details.

(c) A small, one-time true-up was required due to the reporting transition (see footnote b).

(d) Tie lines are transmission lines that connect two balancing authority areas. Imports are negative; exports are positive.

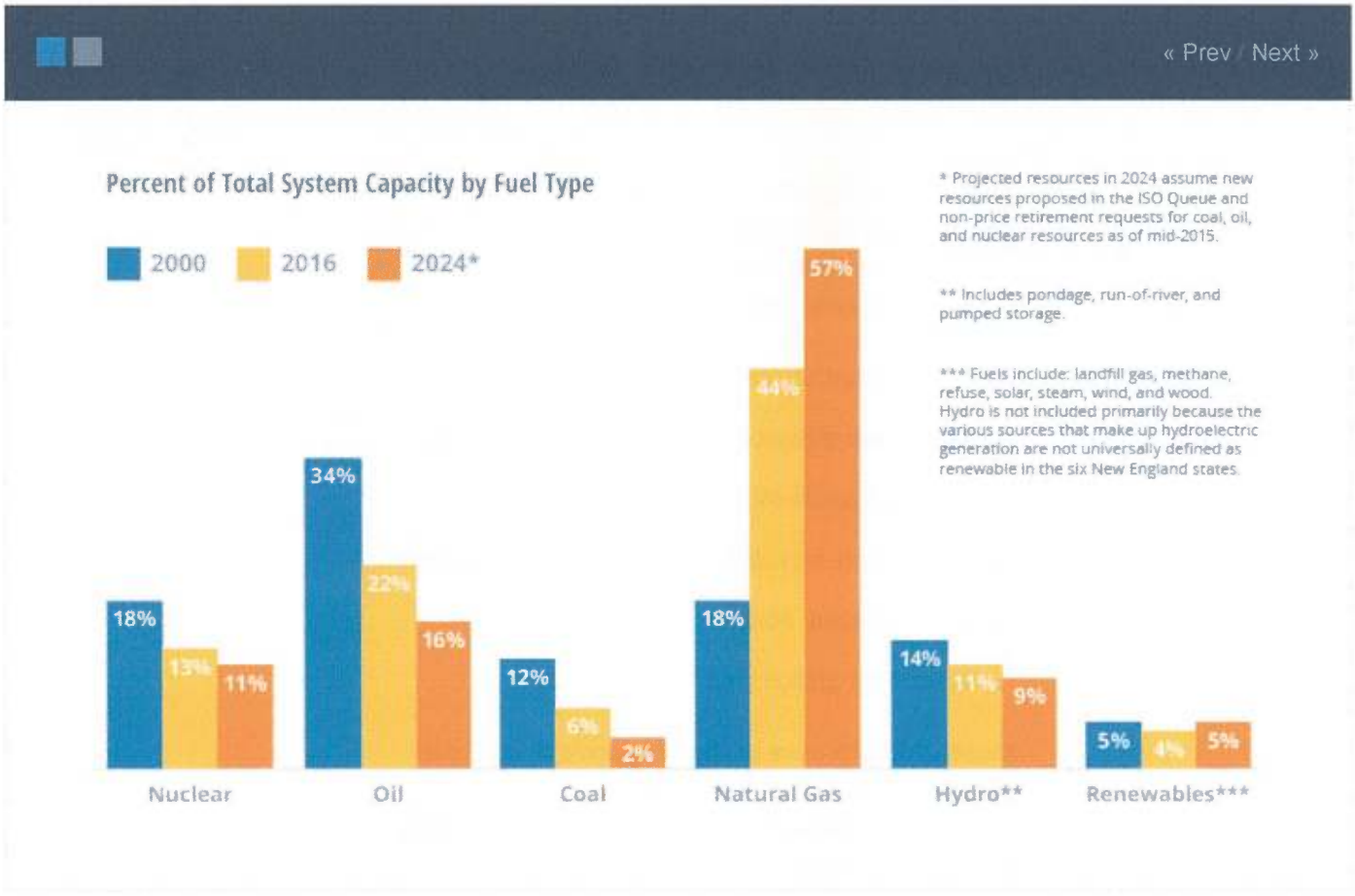
(e) The energy used to operate pumped storage plants.

Ties	3,320		
New Brunswick	28		
Québec	1		
New York	3,291		
Pumping Load (e)	1,958		-1.5%
Net Energy for Load (f)	126,834		100.00%

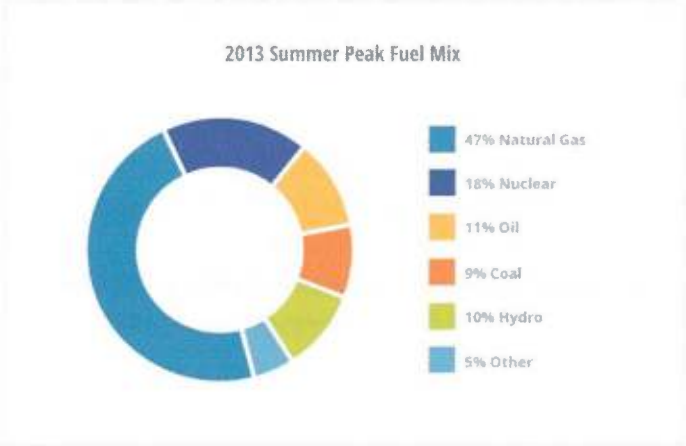
(f) Generation
+ net interchange
- pumping load.

Mix of Supply Resources Has Changed Over Time

The resources making up the region's installed generating capacity (the megawatt capability of all generating units, demand resources, etc.) have shifted dramatically from nuclear, oil, and coal to natural gas as a result of economic and environmental factors. Similarly, the fuels used to produce New England's electric energy have shifted.



However, coal and oil resources still play an important role in New England. Look at fuel usage during high electricity demand on the peak of a summer day in 2013, for example—one of the hottest days in recent years. While coal and oil together produced only about 7% of electricity over that entire year, they produced 20% of peak electricity that day. These fuels have also been playing increasingly important roles over the winter due to natural gas constraints.



Tomorrow's Energy Mix: Resources on the Way OUT

Several of the region's oldest generators—and some of its largest—have already ceased operations or plan to exit the markets by 2019. They take with them over 4,200 MW of regional capacity. Notable exits include:

- Brayton Point Station (1,535 MW from oil and coal)
- Salem Harbor Station (749 MW from oil and coal)
- Vermont Yankee (604 MW from nuclear power)
- Pilgrim Nuclear Station (677 MW from nuclear power)
- Norwalk Harbor Station (342 MW from oil)
- Mount Tom Station (143 MW from coal)

About 6,000 MW more of New England's oil and coal capacity will be over 40 years old in 2020—some substantially older—and at risk of retirement, according to a 2012 ISO analysis.

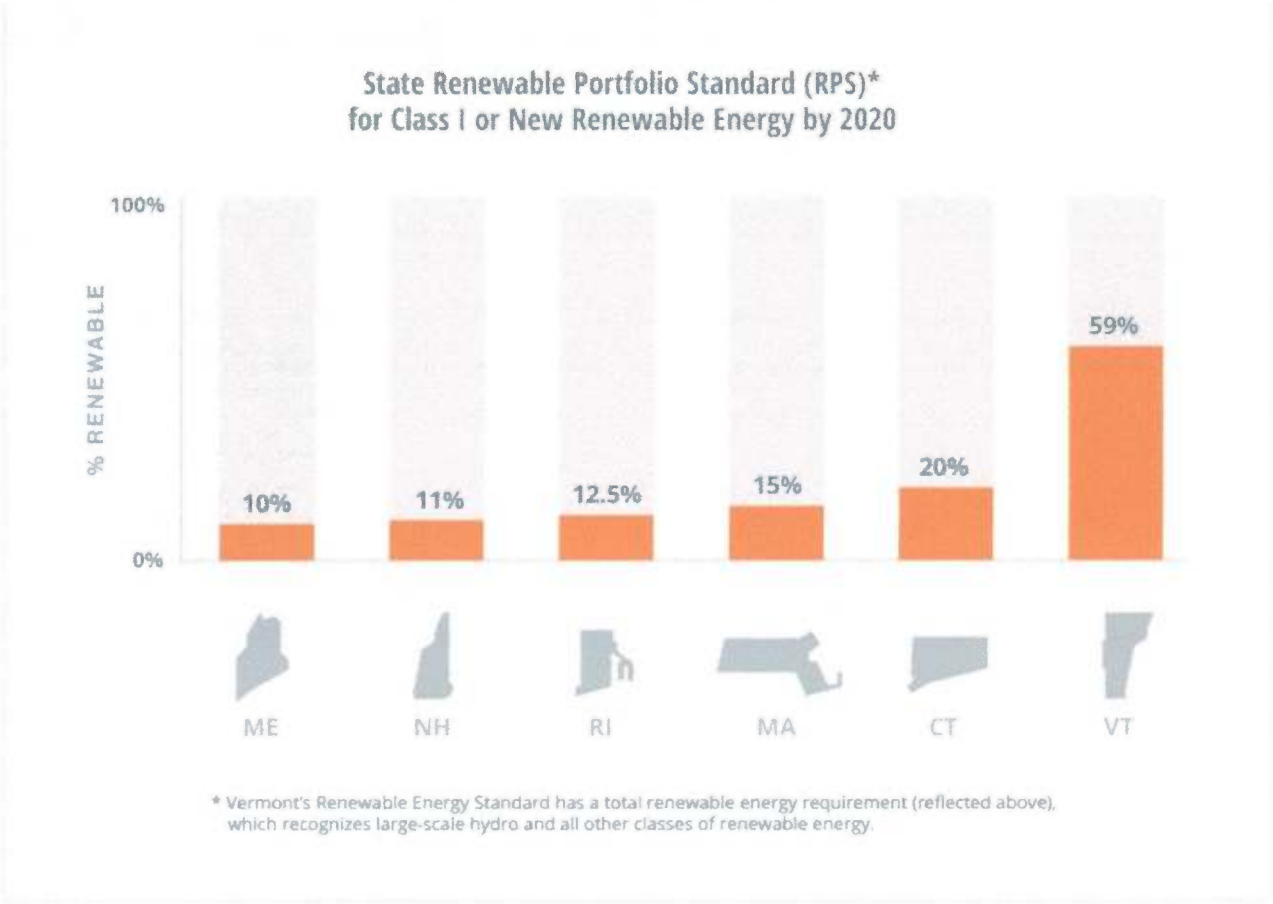
Total MW Retiring in New England*	
Connecticut	354 MW
Maine	37 MW
Massachusetts	3,181 MW
New Hampshire	4 MW
Rhode Island	13 MW
Vermont	637 MW
Total	4,226 MW

Source: Status of Non-Price Retirement Requests, December 18, 2015

* Megawatts (MW) generally based on relevant Forward Capacity Auction (FCA) summer qualified capacity. Total includes full and partial generator Non-Price Retirement (NPR) requests for Capacity Commitment Period (CCP) 2013-2014 through CCP 2019-2020; does not include NPRs for demand response (DR) resources.

Tomorrow's Energy Mix: Resources on the Way IN

State Renewable Portfolio Standards (RPS) promote the development of renewable energy resources by requiring electricity providers (electric distribution companies and competitive suppliers) to serve a minimum percentage of their retail load using renewable energy.

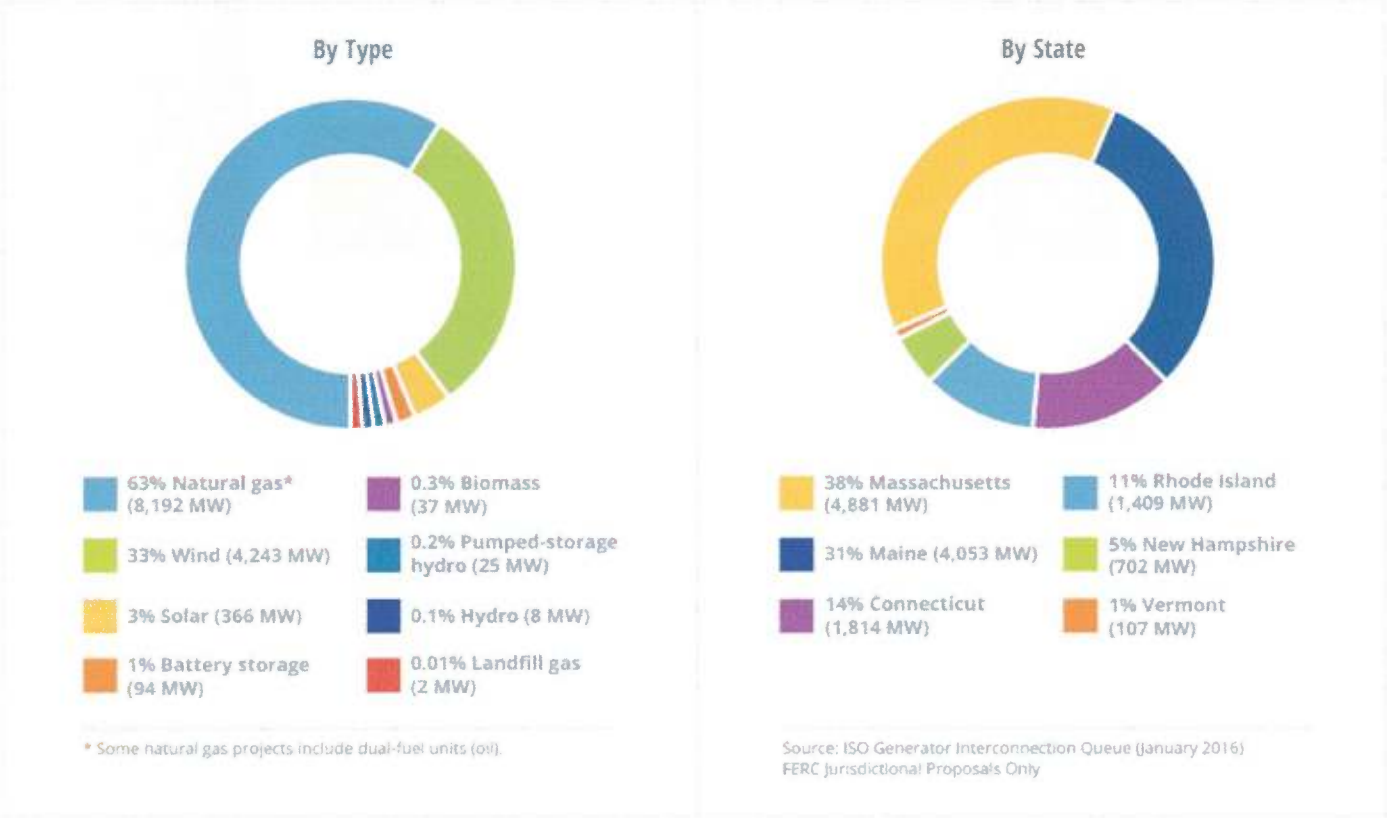


Demand resources, such as load management, distributed generation, and energy-efficiency projects, have increased from 100 MW in 2003 to about 2,300 MW today. This translates into thousands of individual demand assets integrated into the power system. State-funded EE programs are leading the way in this expansion, and the ISO's efforts to analyze the long-term impacts are ongoing.

- New England states' investments in EE programs totaled approximately $3 billion from 2009 to 2013. The ISO estimates the states will invest about $1 billion annually in EE programs from 2019 to 2024.
- The amount of EE performing as demand resources in the Forward Capacity Market is increasing at an average of almost 200 MW per year.

By examining new generator proposals submitted to the ISO, it's easy to see how public policy and economics are driving the industry's choices for tomorrow's fuel sources.

As of January 2016, about 13,000 MW have been proposed in the ISO Generator Interconnection Queue.



The significant upward trend in renewable and energy-efficiency (EE) resources is clear.

Learn about how ISO New England is actively pursuing innovations to help create a more efficient, responsive, reliable system that can handle expanded renewable generation and smart grid technology.

Air Emissions

Market forces and environmental policies have significantly driven down the use of oil- and coal-fired generation over the last two decades. As a result, the region leads much of the rest of the country in clean-technology investment. These factors have resulted in significant declines in regional air emissions over the long term. From 2001 to 2014, annual emissions for nitrogen oxides (NO_X), sulfur dioxide (SO_2), and carbon dioxide (CO_2) declined by 66%, 94%, and 26%, respectively. However, oil- and coal-fired electricity production has risen over recent winters, driving up emissions, with a slowdown in declines—even some upticks—resulting. To learn more, read "Regional air emissions: significant long-term reductions, with slight uptick in 2013," or see the ISO New England Electric Generator Air Emissions Report.

Reduction in Average Emission Rates (lb/MWh)

(Annual Aggregate Emissions in kTons)

Reduction in Aggregate Emissions (ktons/yr)				Reduction in Average Emission Rates (lb/MWh)			
YEAR	NO_x	SO_2	CO_2	YEAR	NO_x	SO_2	CO_2
2001	59.73	200.01	52,991	1999	1.36	4.52	1,009
2014	20.49	11.68	39,317	2014	0.38	0.22	726
% REDUCTION, 2001-2014	↓66%	↓94%	↓26%	% REDUCTION, 1999-2014	↓72%	↓95%	↓28%

Source: *2014 New England Electric Generator Air Emissions Report*, January 2016